

REMARKS

In response to the Office Action dated July 8, 2010, Applicant respectfully requests reconsideration. Claims 29-50 were previously pending in this application. Claims 29, 36, 39, 40 and 43 have been amended. As a result, claims 29-50 are pending for examination with claims 29 and 43 being the independent claims. No new matter has been added.

Rejections under 35 U.S.C. §112

Claims 29-50 stand rejected under 35 U.S.C. §112, second paragraph, as purportedly being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention.

The Office Action states that there is insufficient antecedent basis in claims 29 and 49 for “the membrane,” advising that the limitation should recite “the flexible membrane.” As suggested by the Office Action, claims 29 and 49 has been amended to replace “the membrane” with “the flexible membrane.”

The Office Action also states that there is insufficient antecedent basis in claim 43 for “the chip,” advising that the limitation should recite “the integrated circuit chip.” As suggested by the Office Action, claim 43 has been amended to replace “the chip” with “the integrated circuit chip.”

Accordingly, withdrawal of the rejections of claims 29, 43 and 49 under 35 U.S.C. §112 is respectfully requested. Withdrawal of the rejections of claims 30-42 which depend from independent claim 29; and claims 44-48 and 50 which depend from independent claim 43 is also respectfully requested.

Rejections Under 35 U.S.C. §103

Claims 29-42 stand rejected under 35 U.S.C. §103(a) as purportedly being unpatentable over Cabuz et al., U.S. Patent No. 6,837,476 (“Cabuz”) in view of Benzel et al. U.S. Patent No. 2003/0116813 (“Benzel”). Claim 43 stand rejected under 35 U.S.C. §103(a) as purportedly being unpatentable over Hamilton et al., U.S. Patent No. 5,901,037 (“Hamilton”) in view of Benzel. Claims 44-50 stand rejected under 35 U.S.C. §103(a) as purportedly being unpatentable over Hamilton in view of Benzel and further in view of Cabuz.

The Office Action acknowledges that Cabuz does not disclose a semiconductor substrate comprising at least one transistor. However, the Office Action refers to Benzel in disclosing a transistor disposed in a semiconductor substrate, asserting that it would have been obvious to substitute Benzel's semiconductor substrate having a transistor for the substrate of Cabuz.

Independent claims 29 and 43 have been amended to include a pump configured to provide pressure sufficient to set a fluid in motion through the ventilating duct so as to cool the integrated circuit chip. Support for this amendment can be found, for example, in Figs. 4 and 5 and paragraphs [0028] to [0031] of the published specification.

Cabuz Does Not Disclose a Pump Configured to Move Fluid

The Office Action refers to valve 5 of Cabuz as a "pump." However, Applicant points out that nowhere in the figures nor in the description/claims of Cabuz does Cabuz show or even mention a pump. A pump is a device for moving or compressing a liquid or gas, while the valve described in Cabuz is not a pump, but rather is a device that regulates flow of a fluid. In fact, the word "pump" itself is absent in the text of the description of Cabuz.

With respect to the implementations taught in Figs. 1-6 of Cabuz, the diaphragm 20 includes openings 25a and 25b to allow fluid to flow through the diaphragm and reach outlet ports 44a and 44b. Cabuz provides no such teaching of compressing the fluid to move the fluid. Instead, Cabuz teaches no more than to provide a valve between inlet port 42 and outlet ports 44a and 44b that is normally in a closed position. The primary source of fluid motion through the device (e.g., see arrows in Fig. 3) is external to the device itself, with the device acting merely as a flow switch. Further, there would have been no reasonable expectation of success for one of skill, having considered the valve with a perforated membrane as taught in Cabuz, to use such a membrane in creating a pump. A pump having a perforated membrane would be considered to be a damaged pump in which the membrane would require replacement.

The implementations illustrated in Figs. 13-15 also teach a perforated membrane which enables three-way valve functionality through ports 160, 162 and 164. Similar to that discussed above regarding the examples depicted in Figs. 1-6 of Cabuz, no reasonable expectation of success would have existed for one of skill, having considered the particular valve implementation of Cabuz, to use such a membrane in creating a pump.

Figs. 7-9 of Cabuz disclose another implementation of a valve that is normally in a closed position. In this case, compression of the fluid on the upper side of the chamber 86 of the cavity is an undesirable effect, which is solved by addition of a vent opening 94 for back pressure relief (see col. 9, lines 1-21 of Cabuz). No teaching is provided in Cabuz to plug the valve at opening 94 to create a pump by making use of any compression or depression effect from displacement of the membrane. In fact, as discussed above, Cabuz teaches opening 94 to be present for providing back pressure relief. Thus, no pumping function is either realized nor suggested. Rather, fluid motion in Fig. 9 of Cabuz occurs in the lower cavity between inlet port 80 and outlet ports 82a and 82b, which is regulated by the opening and closing of opening 80 by the membrane 88. Such a discussion clearly describes a valve where the cause of fluid flow is external to the device – certainly not the case for a pump.

Additionally, Figs. 10-12 depict a valve that is normally open, where a vent 128 is added to allow the membrane to move freely, without being subject to a negative back pressure. In this implementation, no pumping operation is employed.

In each of the implementations described in Cabuz, the cause of fluid motion through the device is external to the device, where the device itself merely acts as a flow switch. Suction or compression of fluid on one side of the cavity to achieve a pumping function is neither taught nor suggested.

On the contrary, the claims, as currently amended, recite a pump configured to provide pressure sufficient to set a fluid in motion through the ventilating duct so as to cool the integrated circuit chip. Fig. 1 and paragraph [0027] of the published specification provide an example of how an integrated circuit may be cooled where deformation of a membrane 6 toward conductive layer 3 results in *chasing air toward ventilating duct 4*. Further, Figs. 4 and 5 and paragraphs [0028] to [0031] describe an example of directional pumping from an inlet to an outlet achieved through particular embodiments, for example: 1) choosing respective diameters of the inlet and outlet ports so that the fluid will enter the cavity principally from the inlet; and 2) locating the outlet port in the center of the cup-like cavity and the inlet port at the periphery, so that the membrane will cover the inlet at the beginning of its displacement and chase fluid through the outlet. Thus, Cabuz not only fails to teach a pump, but also does not teach features of the openings that provide the ability to achieve directional pumping.

Accordingly, because Cabuz does not disclose a pump that is configured to provide pressure sufficient to set a fluid in motion through a ventilating duct so as to cool an integrated circuit chip, the rejections of independent claims 29 and 43 should be withdrawn.

Comments on the Dependent Claims

For at least the same reasons as for independent claims 29 and 43, the rejections of each of claims 30-42 which depend from claim 29; and each of claims 44-50 which depend from claim 43, should also be withdrawn. However, Applicant reserves the right to specifically address the patentability of dependent claims, if deemed necessary.

Cabuz Does Not Disclose the First Opening Closer to a Cavity Center than the Second Opening

Regarding currently amended dependent claim 39, Cabuz does not disclose the first opening that is positioned closer to a center of the cavity than the second opening. The Office Action refers to outlet ports 44a and 44b illustrated in Fig. 1 of Cabuz in asserting that Cabuz allegedly discloses the second opening positioned closer to a border of the cavity than the first opening is positioned to the border. However, neither of outlet ports 44a and 44b are positioned such that one of the ports is positioned closer to the center of the chamber 12 than the other.

In contrast, shown as an example in Figs. 4 and 5 of the current application, a first opening O1 is positioned closer to a center of the cavity 2 than a second opening O2. Accordingly, Cabuz does not disclose a first opening that is positioned closer to a center of the cavity than a second opening. Thus, the rejection of dependent claim 39, on this ground, should be withdrawn.

Cabuz Does Not Teach a Flexible Membrane that Deforms Toward the Conductive Layer to Cover the Second Opening and Not the First Opening

With respect the dependent claim 40, the Office Action contends that it is reasonable to assume that the device of Cabuz is capable of meeting the claimed functional limitations. The device of Cabuz, however, does not provide a flexible membrane that deforms in a motion toward the conductive layer so as to cover the second opening and not the first opening, as recited in currently amended claim 40.

Upon inspection of Figs. 11 and 12 of Cabuz, ports 122 and 124 appear to be positioned equidistant from the edge of the chamber 114. Thus, when the diaphragm 120 is activated to cover one of ports 122 or 124, the other port will necessarily be covered as well, rather than one of ports 122 or 124 being covered and the other not being covered.

To the contrary, Fig. 5 of the current application clearly illustrates an example of a flexible membrane 6 that covers a second opening O2 and not a first opening O1 upon deformation of the flexible membrane in a motion toward the conductive layer 3. Second opening O2 is closer to the border of the cavity than first opening O1, which is closer to the center of the cavity, resulting in flexible membrane 6 covering second opening O2 prior to covering first opening O1 upon application of a sufficient voltage. Accordingly, Cabuz does not disclose a device having a flexible membrane that deforms in a motion toward the conductive layer so as to cover the second opening and not the first opening. Thus, the rejection of dependent claim 40, on this ground, should be withdrawn.

CONCLUSION

In view of the foregoing amendments and remarks, this application should now be in condition for allowance. A notice to this effect is respectfully requested. If the Examiner believes, after this amendment, that the application is not in condition for allowance, the Examiner is requested to call the Applicants' representative at the telephone number indicated below to discuss any outstanding issues relating to the allowability of the application.

If this response is not considered timely filed and if a request for an extension of time is otherwise absent, Applicants hereby request any necessary extension of time. If there is a fee occasioned by this response, including an extension fee, that is not covered by an enclosed check, please charge any deficiency to Deposit Account No. 23/2825 under Docket No. S1022.81158US00 from which the undersigned is authorized to draw.

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Respectfully submitted,

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